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XRD
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CONFIDENTIAL
Security Information

BUREAU OF SHIPS GROUP TECHNICAL INSPECTION REPORT

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Classification (Cancelled) (Change Security Information)
By Authority of JOINT CHIEFS OF STAFF JCS-1795/36 DATED 15 APRIL 1949
By *John H. Dugan* Date 22 SEP 1953

⑥ OPERATION CROSSROADS.
SAKAWA (E_x J_ap CL)

TEST ABLE ^⑧LU.

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- ⑪ 1947
- ⑫ 38 p.
- ⑭ XRD-28

Defense Atomic Support Agency
Washington, D. C. 20301

OPERATION CROSSROADS

DIRECTOR OF SHIP MATERIAL

JOINT TASK FORCE ONE

SECRET

(193600)

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GROUP 3
Downgraded at 12 year intervals.
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1 JAN 1965

REG. NO.

6872

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BUREAU OF SHIPS GROUP
TECHNICAL INSPECTION REPORT

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Defense Atomic Support Agency
Washington, D. C. 20301

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F. X. Forest,
Captain, U.S.N.

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SAKAWA (Ex Jap Cruiser)

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EX JAPANESE CRUISER SAKAWA

SHIP CHARACTERISTICS

Completed: 1942 - 44.

HULL

Length Overall: 550 feet 0 inches.

Beam: 49 feet 6 inches.

Drafts at time of test: Fwd. 19 feet 0 inches.

Aft. 19 feet 0 inches.

Standard displacement: 6,000 tons.

Displacement at time of test: 7,929 tons.

MAIN PROPULSION PLANT

Main Engines: Four complete main turbine units were installed in the ship. Each unit consisted of an H.P., I.P., and L.P. turbine. Astern turbine wheels were built into the main turbine casings.

Main Reduction Gears: Four complete sets were installed.

Main Condensers: Four complete sets were installed.

Main Shafts: Four were installed.

Propellers: Four were installed.

Boilers: Six were installed.

Turbo Generators (ships Service) - Four main units and two auxiliaries.

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EX JAPANESE CRUISER SAKAWA

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TECHNICAL INSPECTION REPORT

OVERALL SUMMARY

I. Target Condition After Test.

(a) Drafts after test; list; general areas of flooding; sources.

As soon as the radioactive water of the lagoon cleared sufficiently to permit a close approach to the SAKAWA, the time then being 1700 on "A" day, it was determined that her stern was open to the sea. As may be seen in photo page 30, she was down about two feet by the stern but was not settling appreciably. During the ensuing night the draft aft increased about 10 feet as shown in photo page 34. The vessel, which prior to the test had a starboard list of 1.5 degrees, was now listing to port. By 0930 on "A" plus one day the list had increased to 8 degrees, and by 1000 the main deck was awash amidships on her port side. At 1033 the SAKAWA rolled considerably to port and the stern commenced settling more rapidly. Photo page 36, shows the SAKAWA at 1034 on her port beam with about 400 feet of her side submerged. By 1035, see photo page 37, she was submerged up to her midships section. Her stern then appeared to rest on the lagoon bottom. After this time she settled more slowly until at 1043 her bow disappeared.

Flooding unquestionably started when the SAKAWA'S stern was ripped open to the sea by the air blast. Photos page 28, page 29 and page 30 show the large opening in the mangled stern. Poor watertight integrity, as proved by a pre-blast air test, permitted progressive flooding. After 24.5 hours of slow progressive flooding the main deck was awash. In the next hour rapid progressive flooding, probably due to poorly fitted and damaged hatches, vent trunks, and other fittings in the main deck, sent the SAKAWA to the bottom.

(b) Structural Damage.

Considerable structural damage on the SAKAWA was caused by the air burst. The stern was most badly damaged by the

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SAKAWA (Ex-Jap Cruiser)

blast. Its deck plating was crushed inward (See photo page 30) and shell plating about the counter was twisted and torn open in several places. Shell plating on the starboard side of the SAKAWA was badly wrinkled from approximately frame 145 aft as can be noted in photo page 28. This same picture shows a line of apparent shear between two plates of the sheer strake at frame 170. Photo page 35 is another view of the SAKAWA'S distorted stern. The wrinkles at frame 143, shown in photo page 31, apparently denote the forward limit of structural damage to the shell plating. The only reported structural damage forward on the SAKAWA was the wrinkling of the forecastle deck to a depth of about 18 inches at frame 35.

The superstructure aft of the bridge was smashed down and forward into a mass of twisted wreckage. The mainmast, as shown in photo page 31, was toppled forward and outward until its upper end overhung the port side by about one third its length. The aircraft crane was blown forward onto the main deck. In photos page 31 and page 32, the stack can be seen smashed against the foremast tower which itself was badly distorted. The foremast was angled sharply forward from the tower onto the director house. The house, formerly situated on the main deck frames 95 to 105, was disintegrated. The bridge structure, though warped, is relatively intact. It is interesting to note that, forward of the main bridge structure, the top of the deckhouse between frames 75 and 80 was dished in about a foot. This can be seen in photo page 33. Forward of this damage, a longitudinal bulkhead on the main deck buckled and also sheared vertically at frame 64, (See photo page 32).

The tops of the after mounts were crushed. The tops of the forward mounts were dished in a fore and aft V having a two foot maximum depression. The forward face of mount 1, also was dished somewhat.

Other miscellaneous damage is as follows:

- (a) All life lines on the starboard side were laid flat.
- (b) Many deck fittings such as bitts, chocks, deck winches, were dislodged.

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(c) Access throughout ship was made hazardous and difficult by derangement of ladders, jammed doors, and fallen structure.

(d) Life boats and their stowages were wrecked; the davits aboard at time of test were blown overboard.

(e) Searchlight towers were destroyed. One tower is visible on photo page 32 between foremast and crumpled stack. Overhanging platforms forming part of superstructure and masts were demolished.

(c) Other Damage.

Machinery and electrical damage was unobserved.

II. Forces Evidenced and Effects Noted.

(a) Heat.

None. However, frames numbers and name painted on stern (See photos page 30 and page 33 are clearly visible on port side of SAKAWA. This indicates that the blast came from the starboard side.

(b) Fires and Explosions.

A fire burned on the stern of the SAKAWA from shortly after burst until it was smothered by the ship's submergence. The fire was first identified in aerial motion pictures about 0.5 seconds after burst. This fire, pictured in photo page 25, raged for about two hours. It had died to a smolder (See photo page 34) when the SAKAWA went down.

(c) Shock.

Air blast as evidenced by direction of crumpling and falling of SAKAWA'S ravaged topside structure evidently struck from above and slightly to starboard of dead astern. A comparison of photos page 26 and page 27 show lateral displacement of SAKAWA by blast.

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(d) Pressure.

Unknown.

III. Results of Test on Target.

(a) Effect on propulsion and ship control.

Not observed. It is probable that damage to the stern would have disrupted steering control.

(b) Effect on gunnery and fire control.

Not observed. The guns and torpedo tubes were removed before the test.

(c) Effect on watertight integrity and stability.

The watertight integrity of the SAKAWA was poor and apparently dependent solely upon an intact hull. The air blast which ruptured the hull destroyed the watertight integrity of the ship.

(d) Effect on personnel and habitability.

Unknown except for flooding effect.

(e) Total effect on fighting efficiency.

Complete destruction of fighting efficiency.

IV. General Summary of Observer's Impressions and Conclusions.

As it was possible to board and inspect the SAKAWA prior to her sinking, diving operations on this vessel were assigned low priority and eventually limited by a time factor to recovery of instruments. Hence no diver's report is available on this ship. Information garnered in this report was obtained from following sources,

(a) Photographs.

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1. 16 and 35 MM motion pictures.

2. Aerial sequences of stills.

3. Tower sequences of stills.

(b) Gross Damage Report of Test A.

(c) Report of Technical Observer in PBM Charlie.

(d) Director of Ship Material and Other Initial Boarding Team Reports. Pre-test views of the SAKAWA, photos pages 12 thru 24 were inserted in the report for comparison with the other photographs.

Before accurate comparison is possible it must be noted that the airplane catapults, torpedo tubes, 6" guns and small gun mounts were removed from the ship prior to the test.

The explosion took place approximately 490 yards from and slightly to starboard of the SAKAWA'S stern. At the time of this burst the SAKAWA was headed approximately parallel with the PENSACOLA. When she became visible in aerial photographs, she appeared to be lying with her longitudinal axis about 30 degrees to the right of the axis of the PENSACOLA. The Technical Observer in PBM Charlie submitted the first verbal reports regarding the condition of the SAKAWA. At 1700 on "A" day the Director of Ship Material approached close enough to observe the SAKAWA'S damage from the RECLAIMER (ARS-42).

Observations were continued until darkness forced the withdrawal of the Initial Boarding Teams. The next morning when it was noticed that the freeboard aft was reduced from 12' 3" to less than a foot, an attempt was made, despite the fact that the ship was still radiologically dangerous, to tow her into shallow water. The ACHOMAWI went alongside at 0906 on "A" plus one day for this purpose. Before this could be accomplished, though the ACHOMAWI had the SAKAWA in tow and was pulling astern to get the ship clear of the array, the SAKAWA sank. When the ACHOMAWI cast loose the SAKAWA had been moved astern about 150 feet.

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V. Preliminary Recommendations.

None.

VI. Pre-test Statistics.

(a) Instructions for loading the vessel specified the following:

ITEM	LOADING
Fuel Oil	33%
Diesel Oil	33%
Gasoline	None
Ammunition	None
Potable and Reserve Feed Water	95%
Salt Water Ballast	95%

Details of the actual quantities of the various items aboard are included in Report 7, Stability Inspection Report, submitted by the ship's force in accordance with "Instructions to Target Vessels for Tests and Observations by Ship's Force" issued by the Director of Ship Material. This report is available for inspection in the Bureau of Ships Crossroads Files.

The SAKAWA floated at an estimated draft of about 19 feet. . No draft marks were fitted on the SAKAWA. Freeboard heights were measured forward at frame 10 and aft at frame 150 and found to be 23' 3" and 12' 3" respectively. A comparison of ship's plans and freeboard heights yielded the 19 foot figure. She had a list of about 1.5 degrees to starboard.

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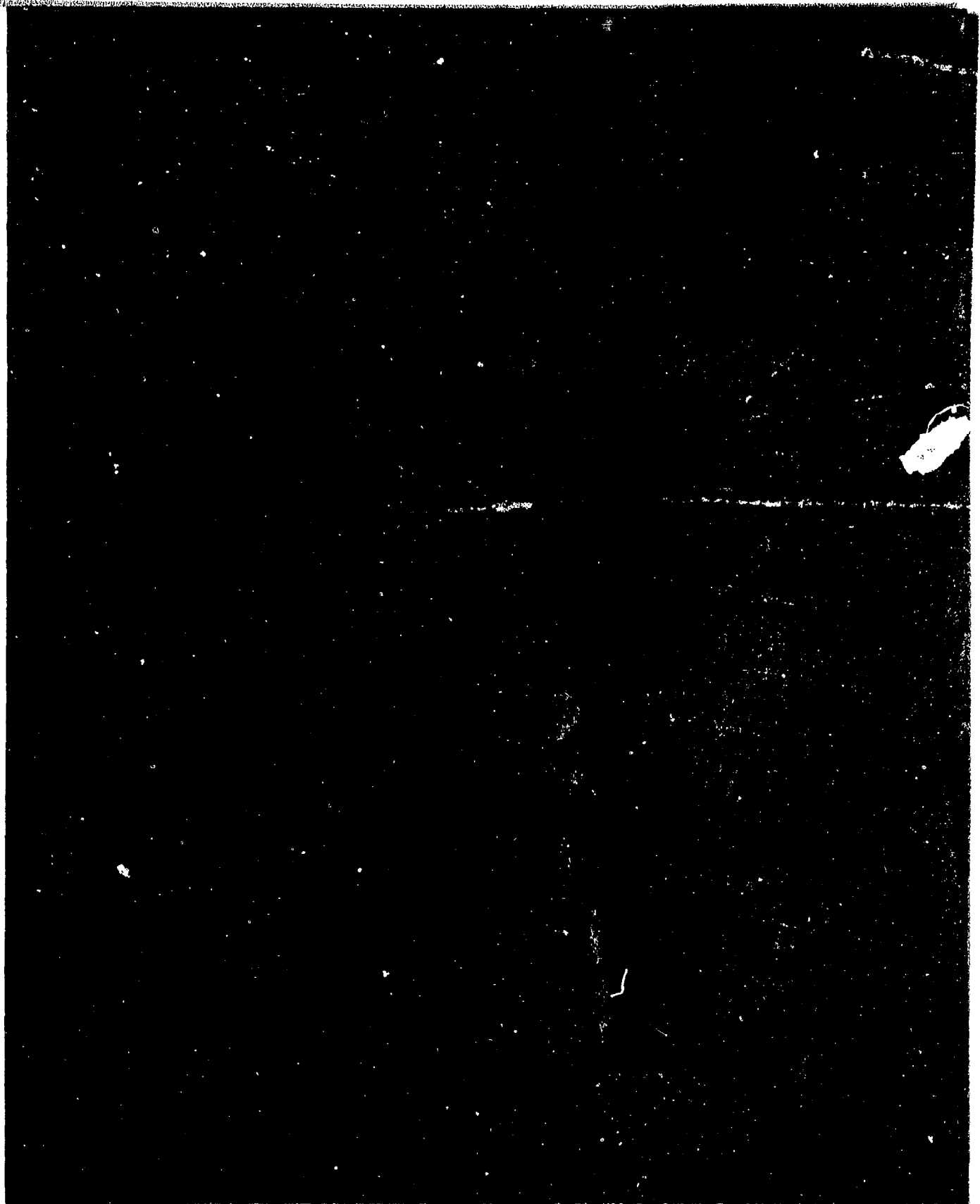
PHOTOGRAPHS

TEST ABLE

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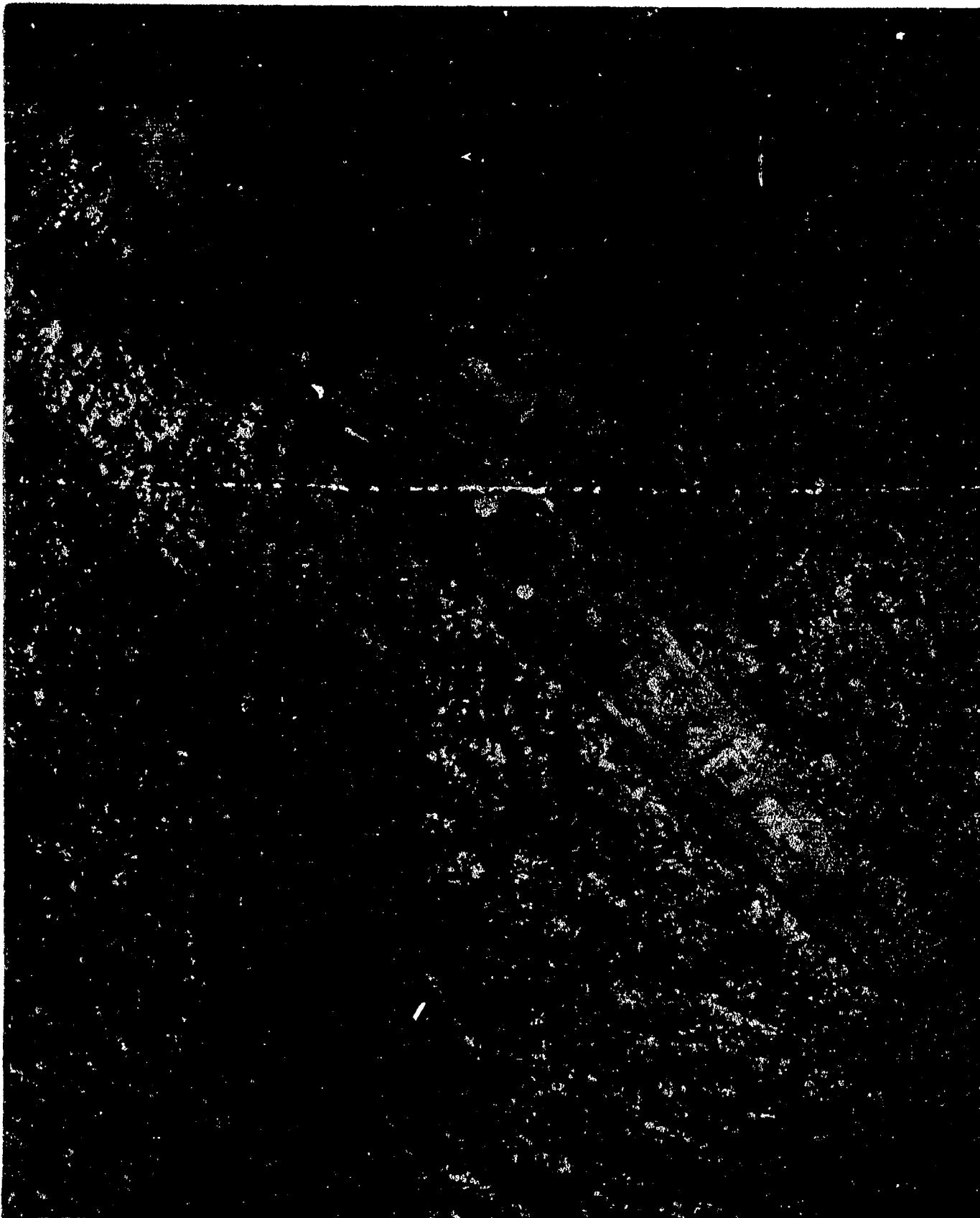
DA-CR-113-89-0900 (-11) 1 July 46/50MM/Obl. Var. 4,000'/Bikini/Secret
Print #26. Pre-burst view of SAKAWA in target array on Able day.
LAMSON and ARKANSAS are seen in back ground. SKATE and YO160 are
in foreground.

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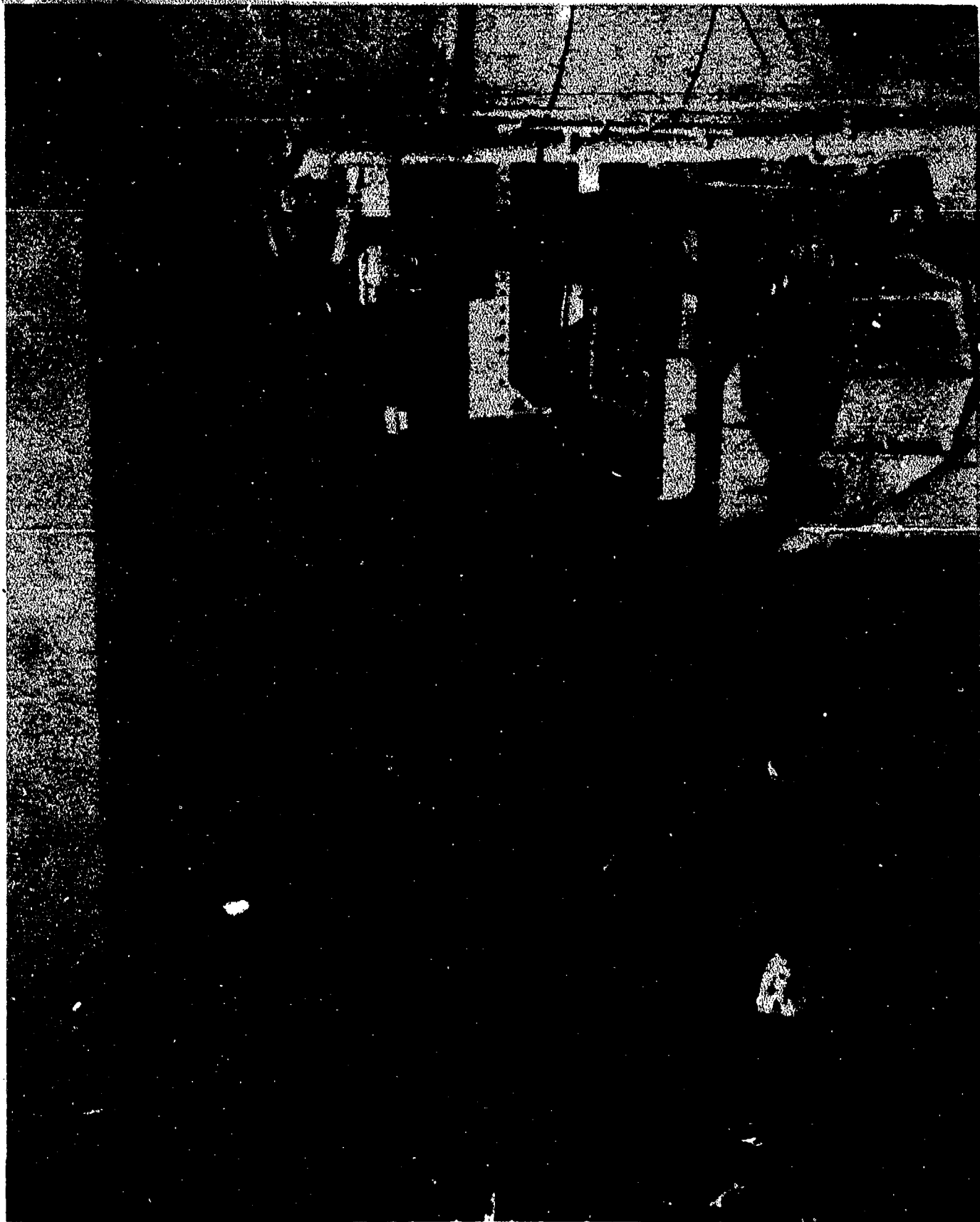
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BA-CR-219-28. Vertical aerial of SAKAWA before burst. Barge alongside was used for living quarters.

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BuAer Photo 19 April 1946. Pre-test view of SAKAWA'S starboard side taken from bridge at about frame 40.

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BuAer Photo 19 April 1946. Pre-test view of SAKAWA's port side taken from bridge at about frame 40.

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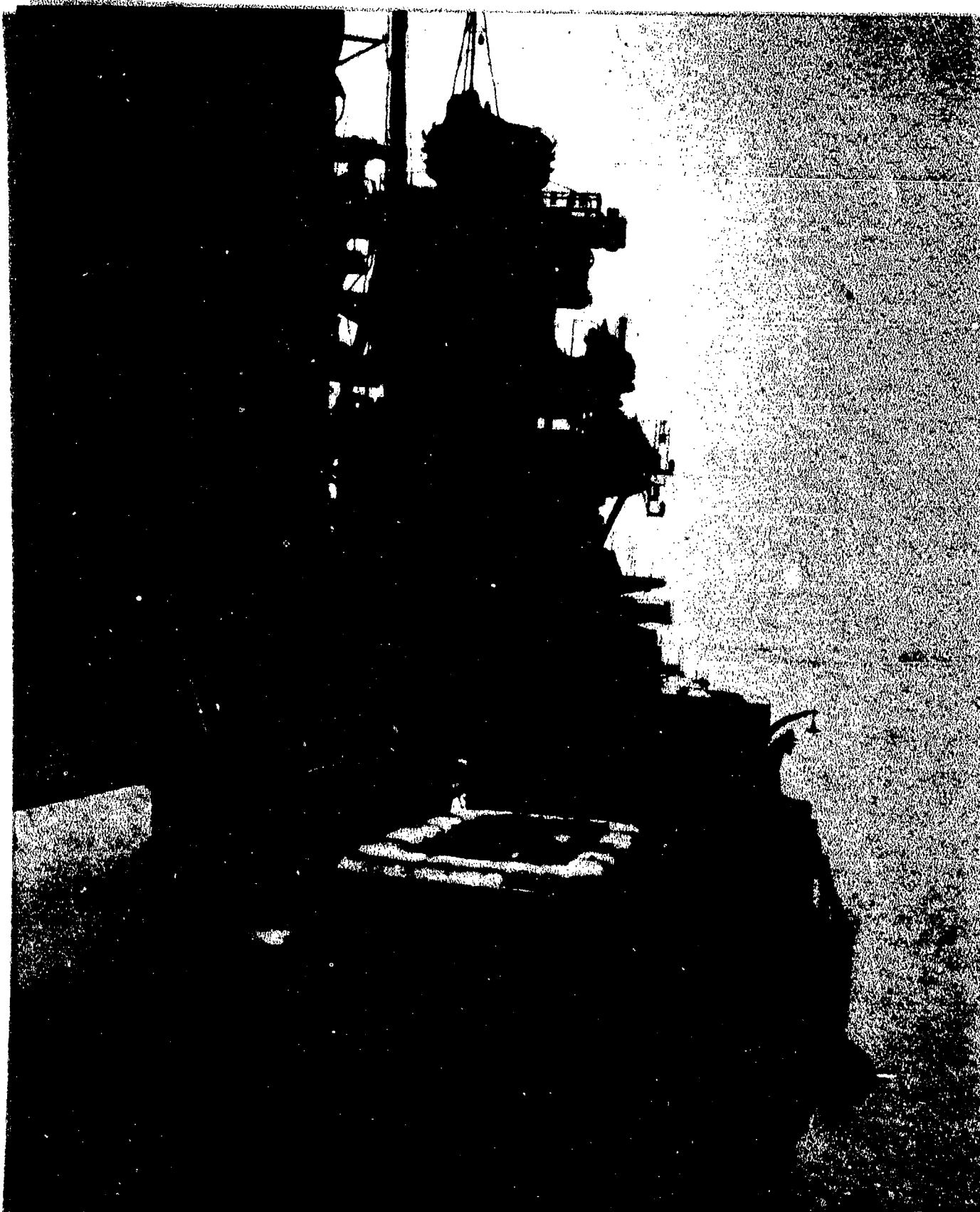
BuAer Photo (19 April 1946). Pre-test view of SAKAWA'S bridge superstructure taken from the port side of deck house structure at about frame 108 aft.

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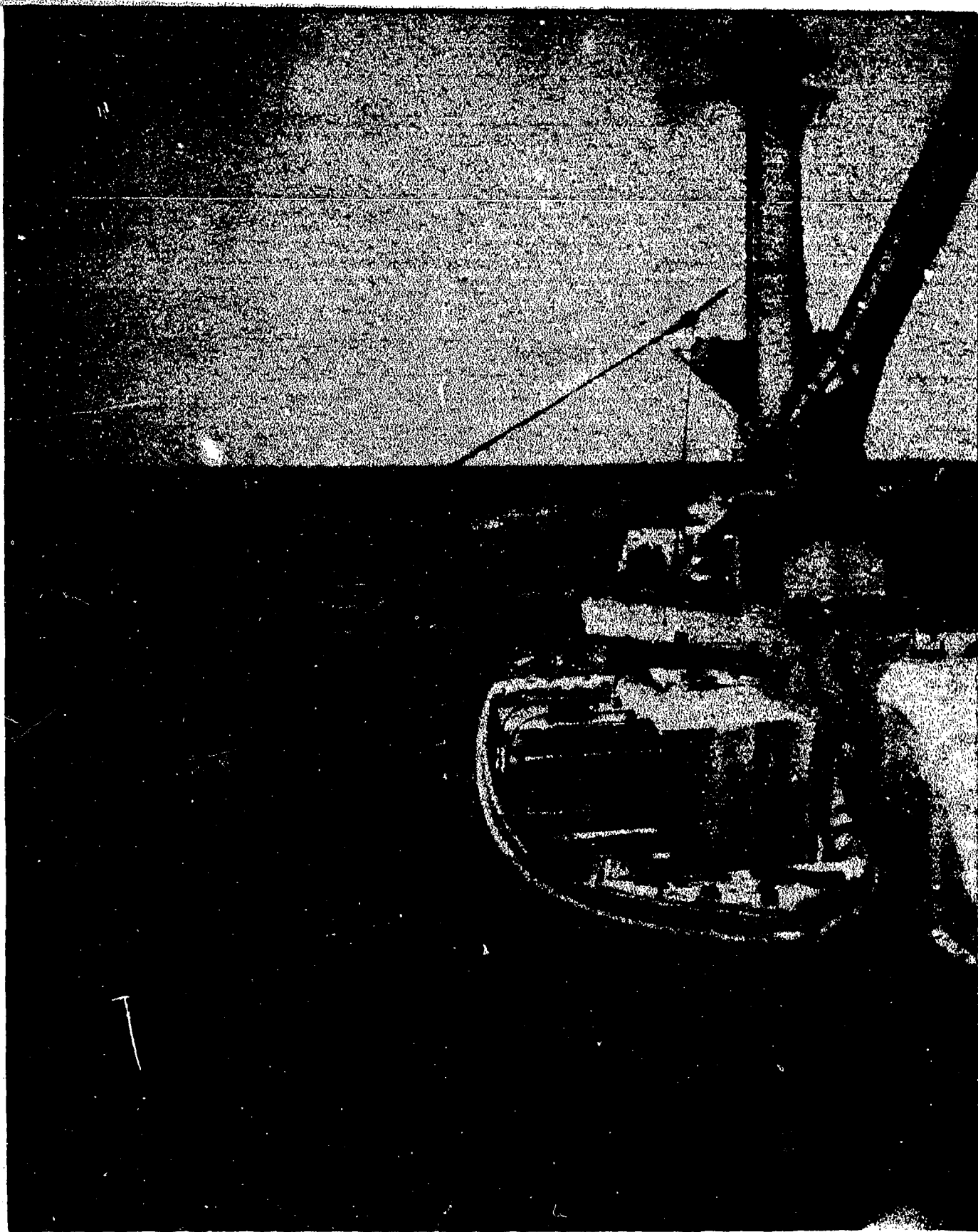
BuAer Photo (19 April 1946). Pre-test view of SAKAWA'S bridge superstructure. taken from the starboard side of deck house structure at about frame 108 aft.

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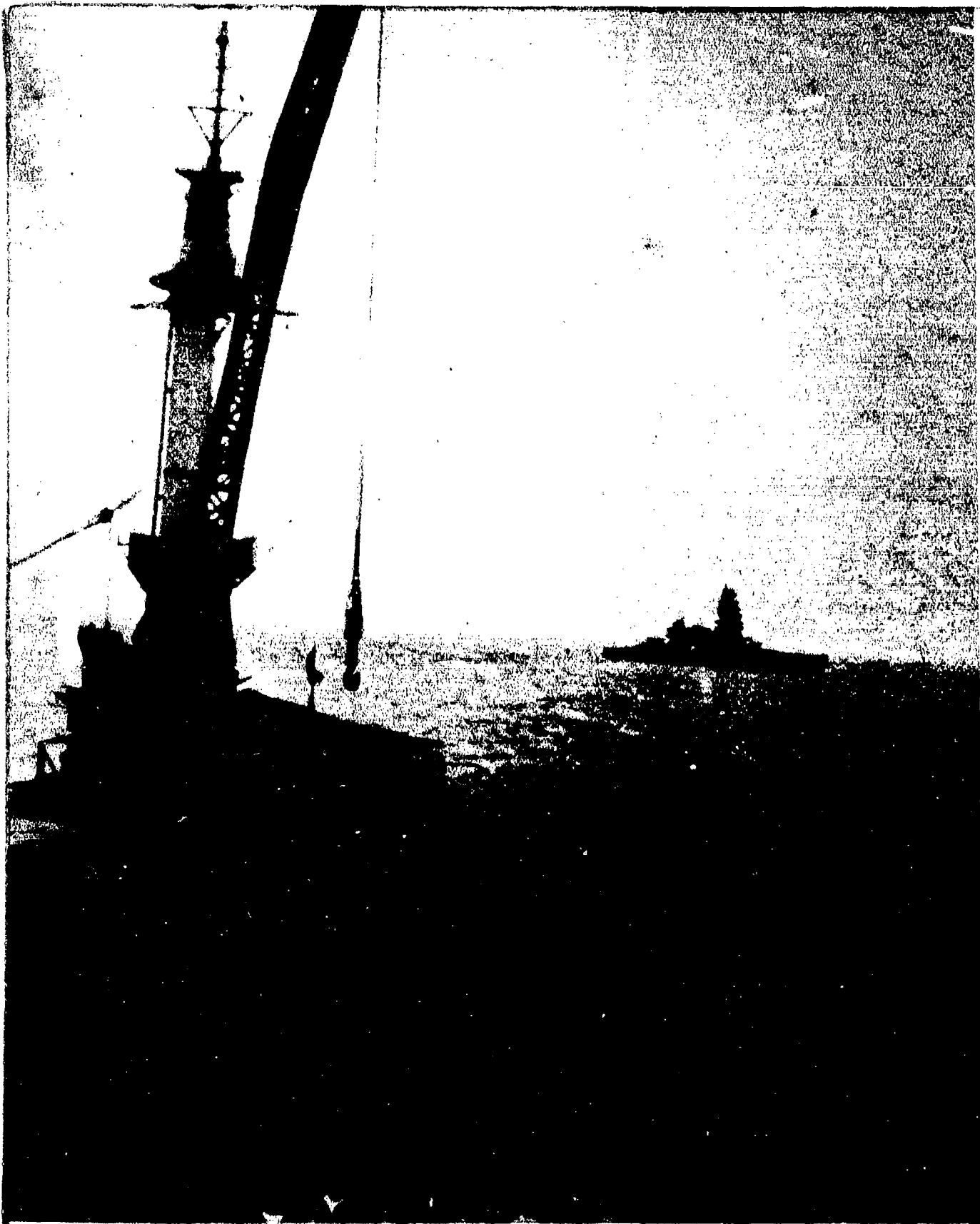
BuAer Photo (19 April 1946). Pre-test view of SAKAWA'S stern taken from gun tub located atop deck house at frame 117 starboard.

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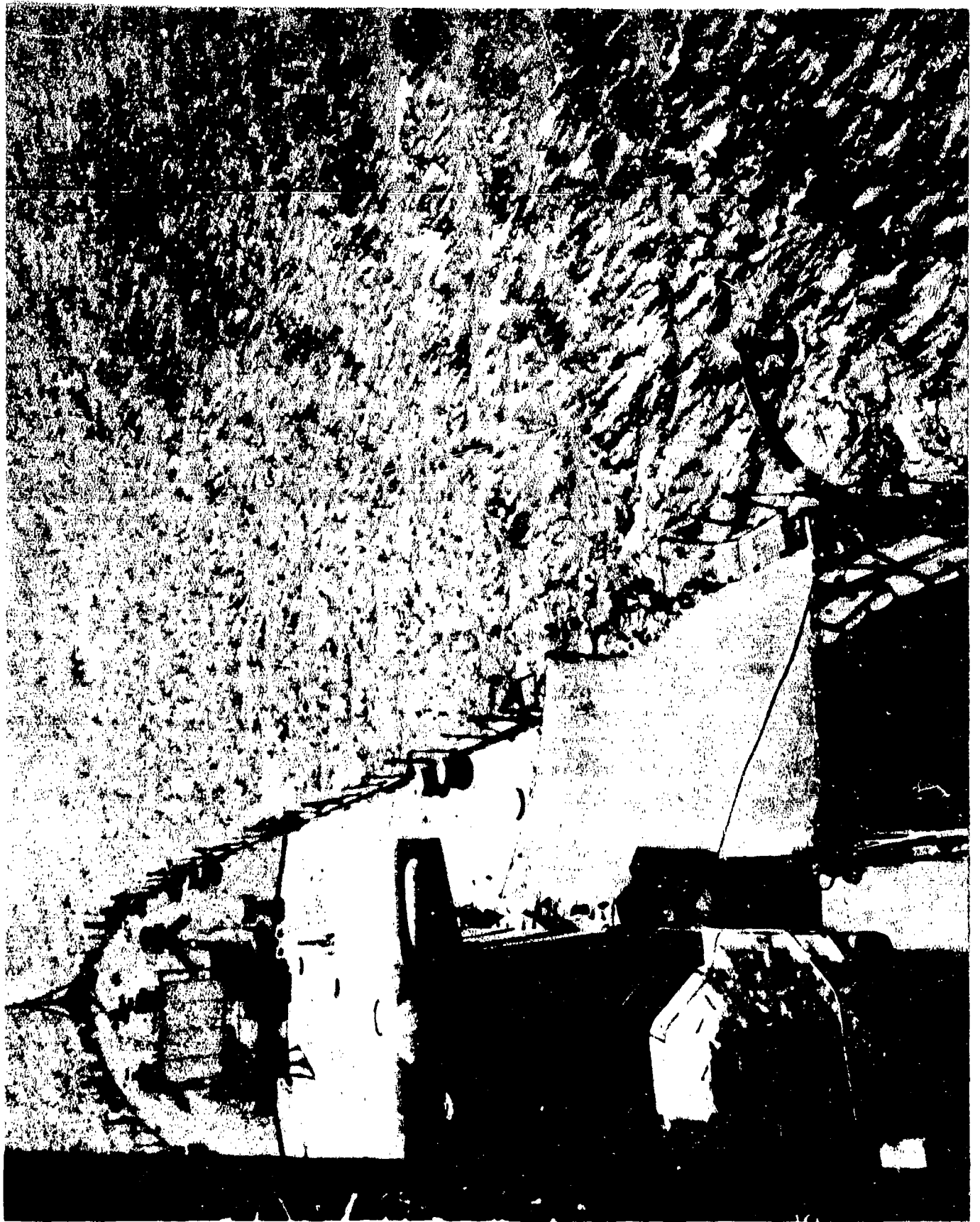


BuAer Photo (19 April 1946). Pre-test view of SAKAWA'S stern taken from gun tub located atop deck house at frame 117 port.

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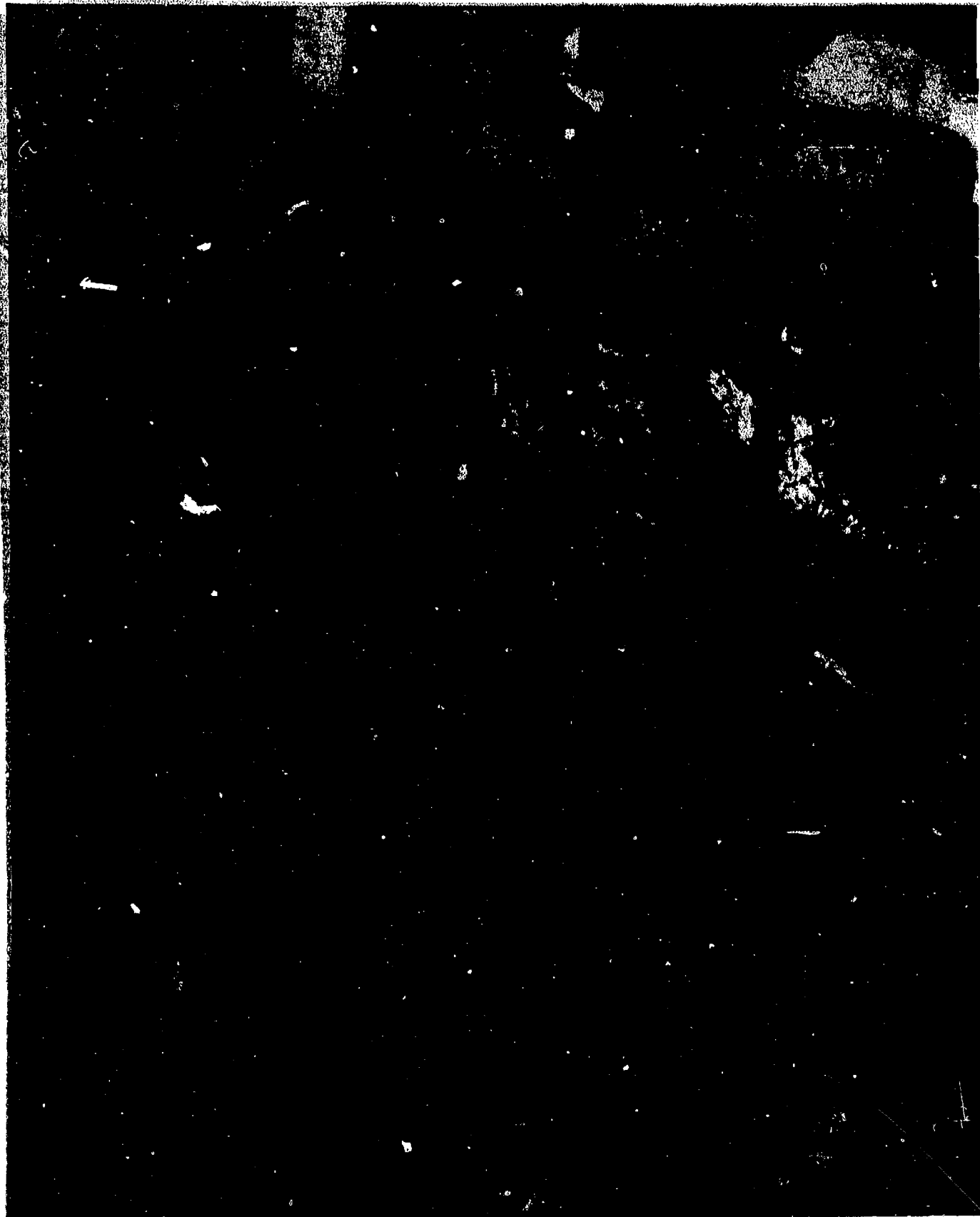
BuAer Photo (19 April 1946). Pre-test view of SAKAWA'S bow taken from starboard side of bridge at frame 79.

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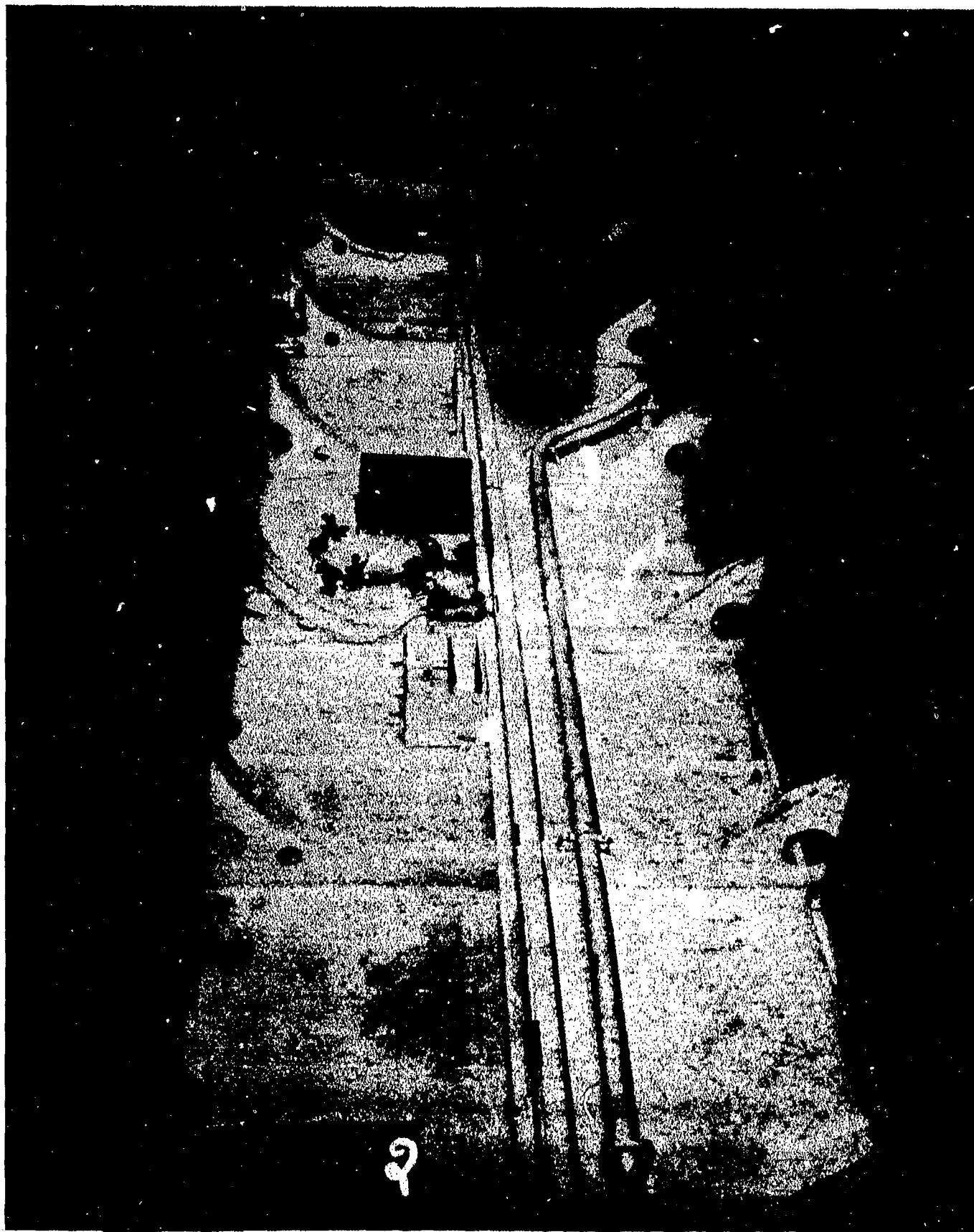
BuAer Photo (19 April 1946). Pre-test view of SAKAWA'S bow taken from port side of bridge at frame 79.

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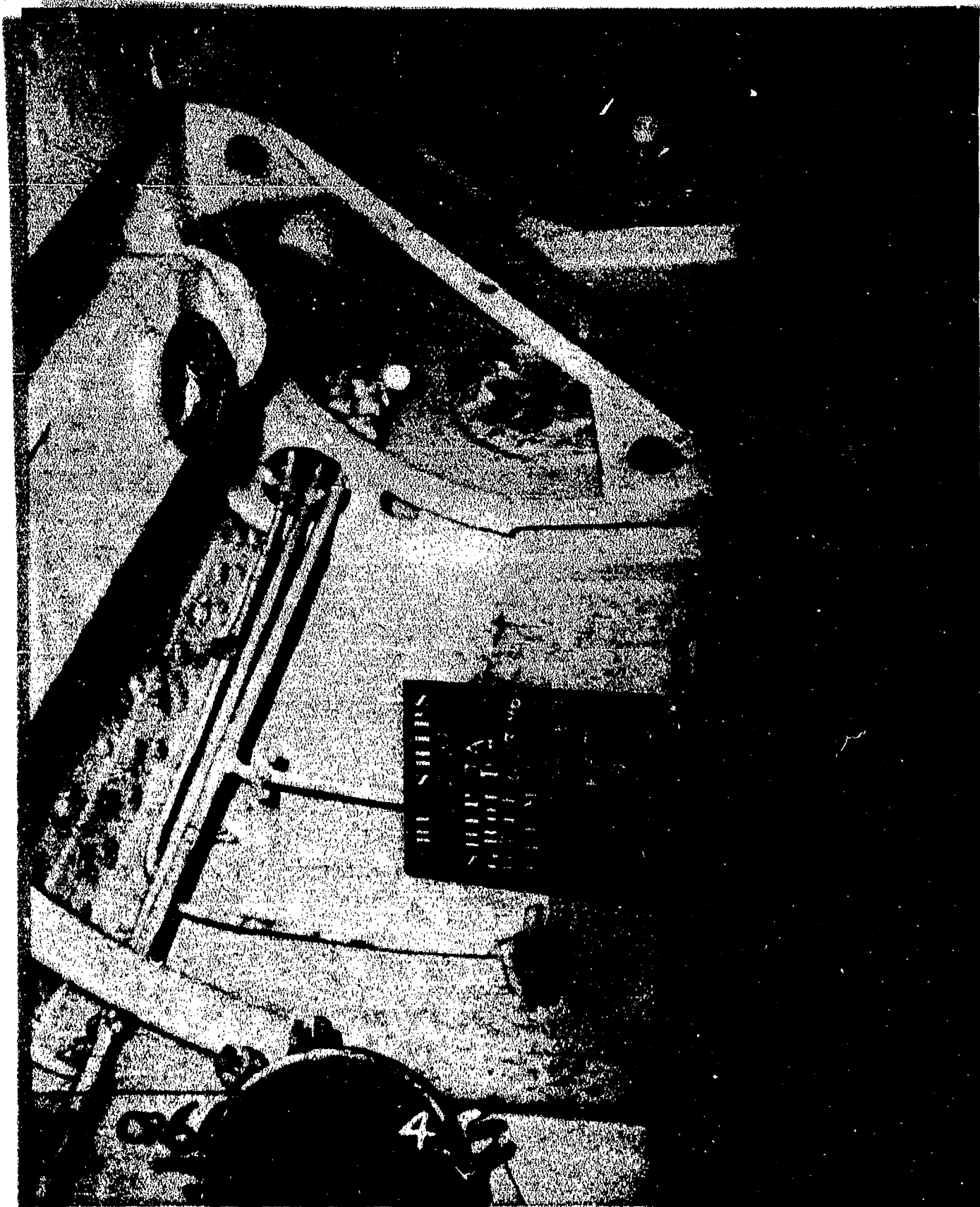
BA-CR-66-578-2. Details of longitudinals and transverse framing on SAKAWA. Picture taken before test on second deck, frame 129 to 134, starboard.

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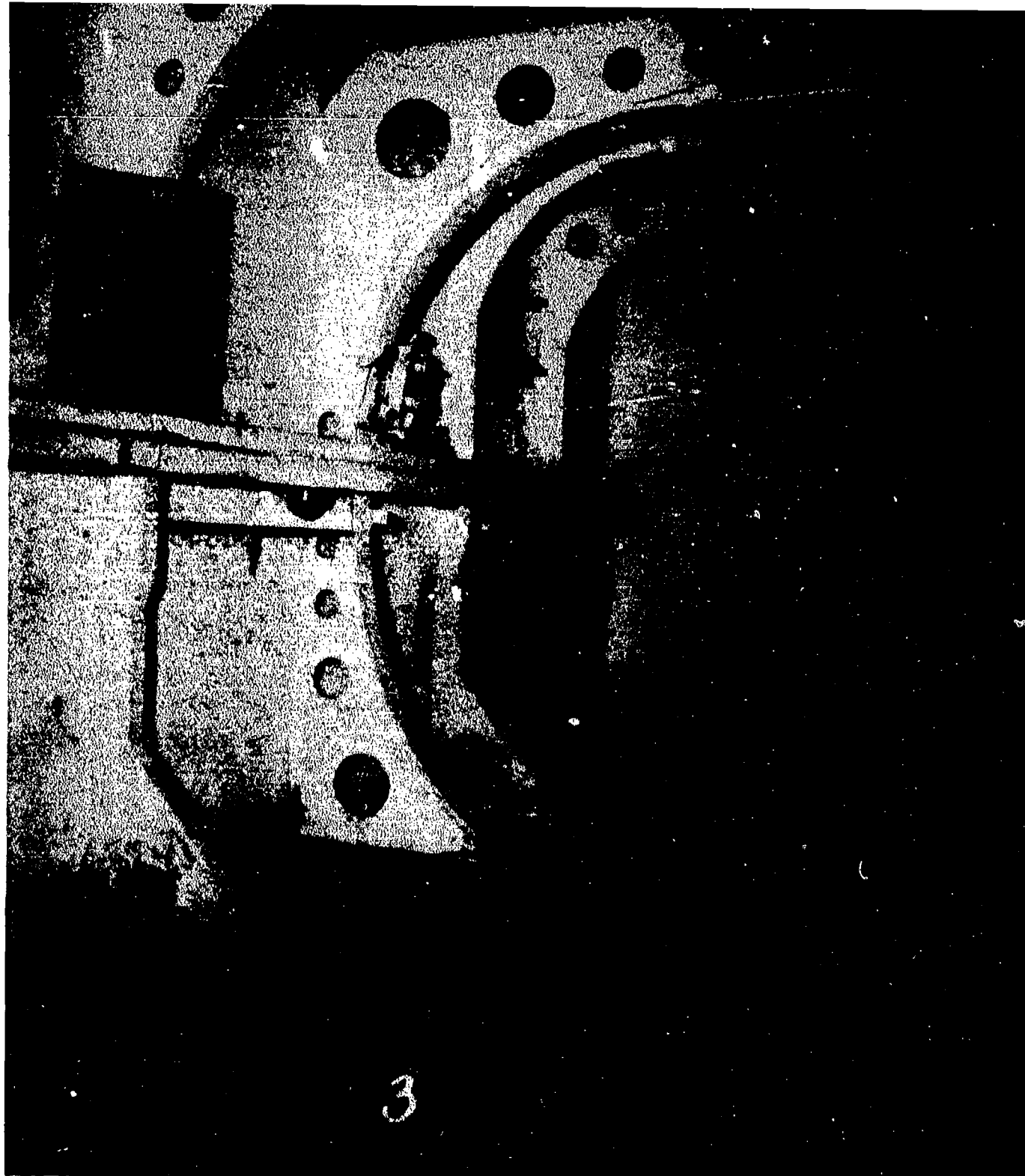
BA-CR-66-578-4. Reinforced bracket, frame 91, starboard side, second deck. Picture taken before test.

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BA-CR-66-578-3. Web details, frame 146, starboard side, second deck.
Picture taken before test.

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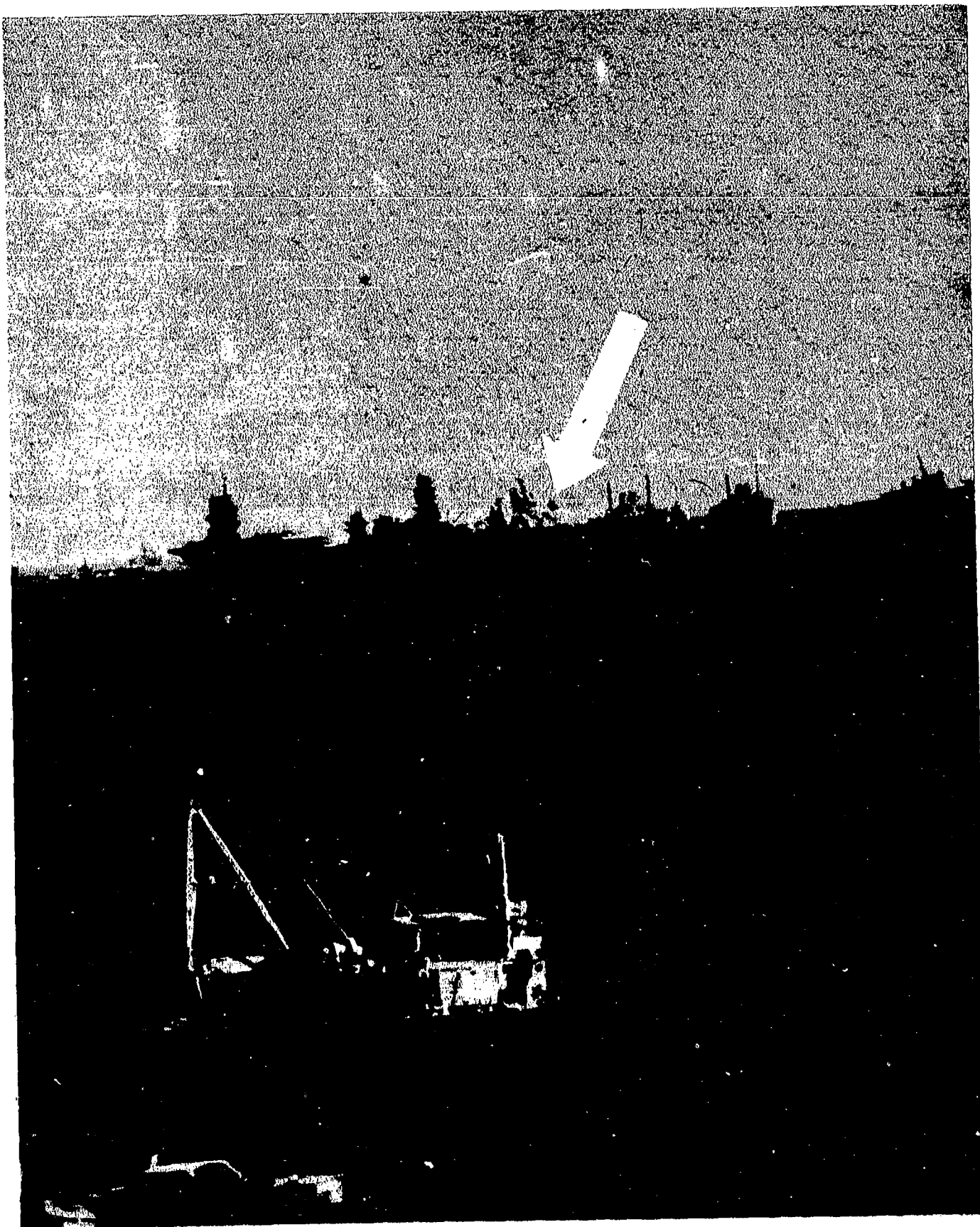
DA-CR-PBM2-48-1 July 46 (-11) F56-40'' Obl 12000 Pa Secret. Print #39. Early view of fire on SAKAWA. Fire initially identified one half second after burst. This picture taken 50 seconds after burst shows superstructure missing aft.

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DA-CR-T3A-31/79 (-11) 1 July 46/40''/Bikini/Secret. Print #1. Target positions three seconds before Able burst as viewed from Enyu Island. From left to right: NAGATO, NEVADA, BRISCOE, STACK, and BANNER. SAKAWA superstructure can be seen (arrow) behind NEVADA.

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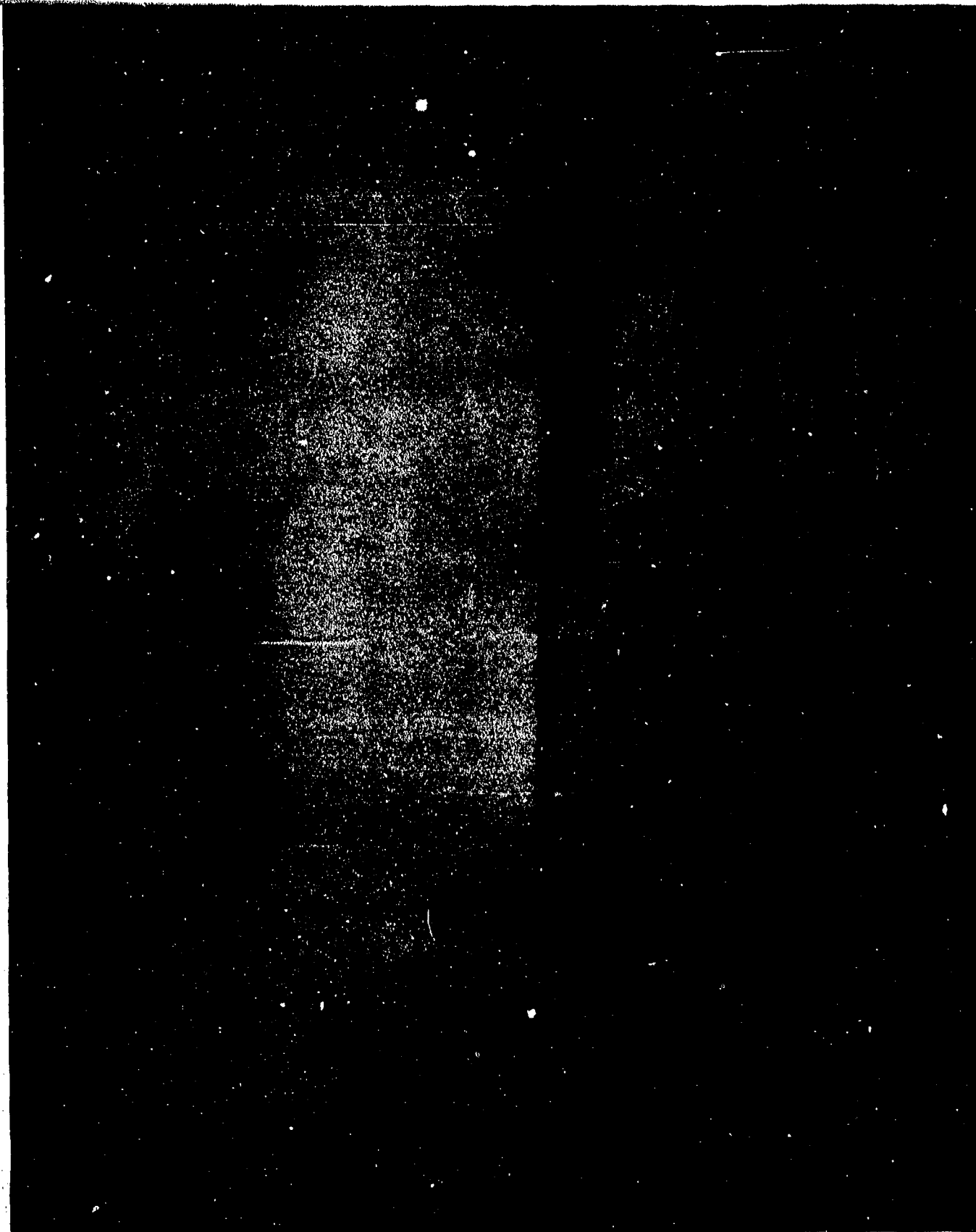
DA-CR-T3A-31/79 (-11) 1 July 46/40''/Bikini/Secret. Print #19. View of target ships 57 seconds after burst. SAKAWA (arrow indicates bow) has been displaced to right. (Compare with photo page 26).

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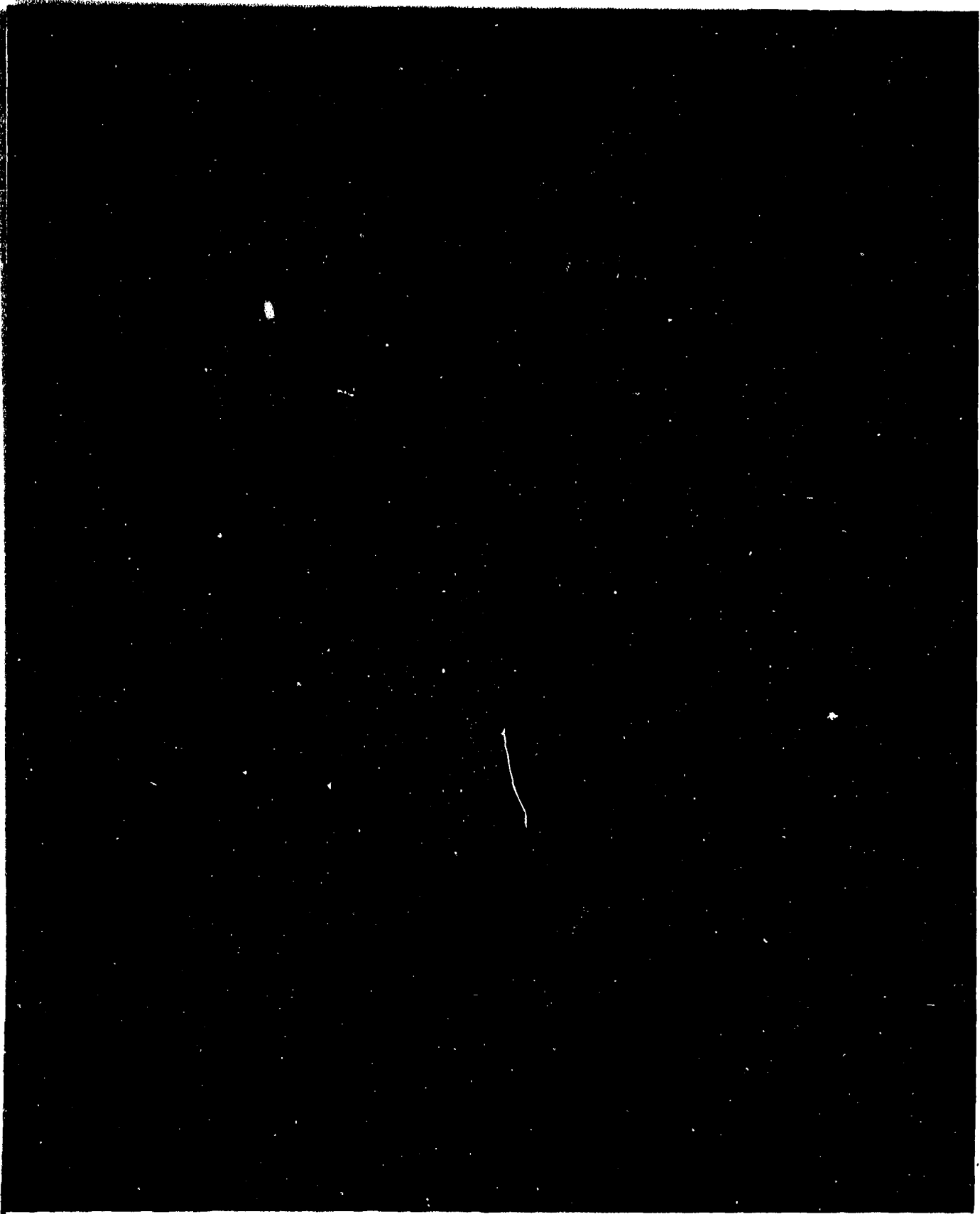
AA-CR-62-1832-12. View of SAKAWA'S starboard quarter showing her listing slightly to port and down by the stern.

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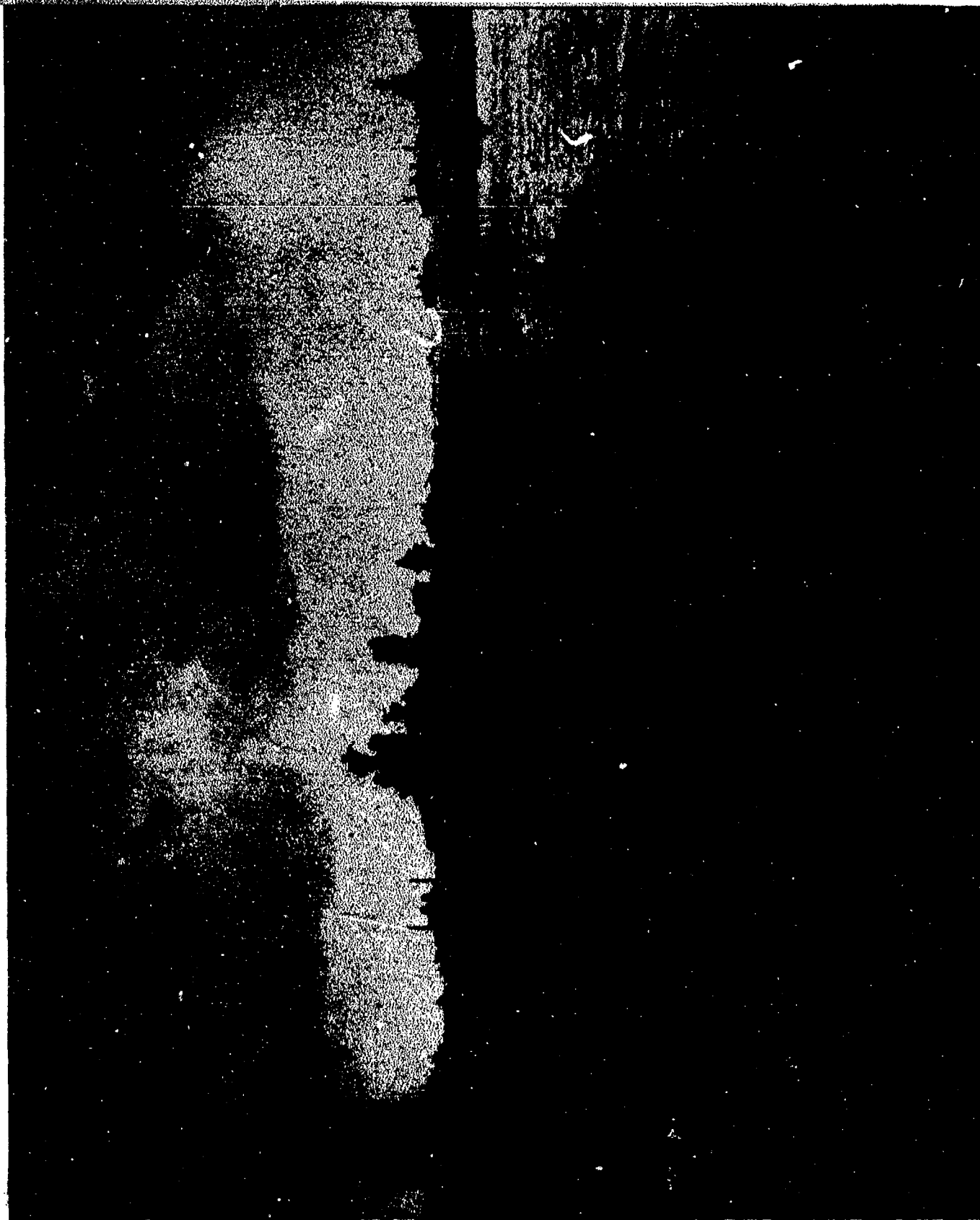
AA-CR-62-1859-10. View of SAKAWA'S port quarter.

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AA-CR-62-1832-6. Plating of SAKAWA'S stern shown blown out and upwards. Demolished stack and house structure shown. Mast and airplane crane have been toppled. Wrinkle in shell plate appears just aft of mast. 6 inch guns removed before Test.

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AA-CR-62-1832-5. Port view of SAKAWA main deck air blast damage showing mainmast trailing over the side, the long vertical rip in stern plating, and the crumpled deck aft. The six inch guns were removed before the test.

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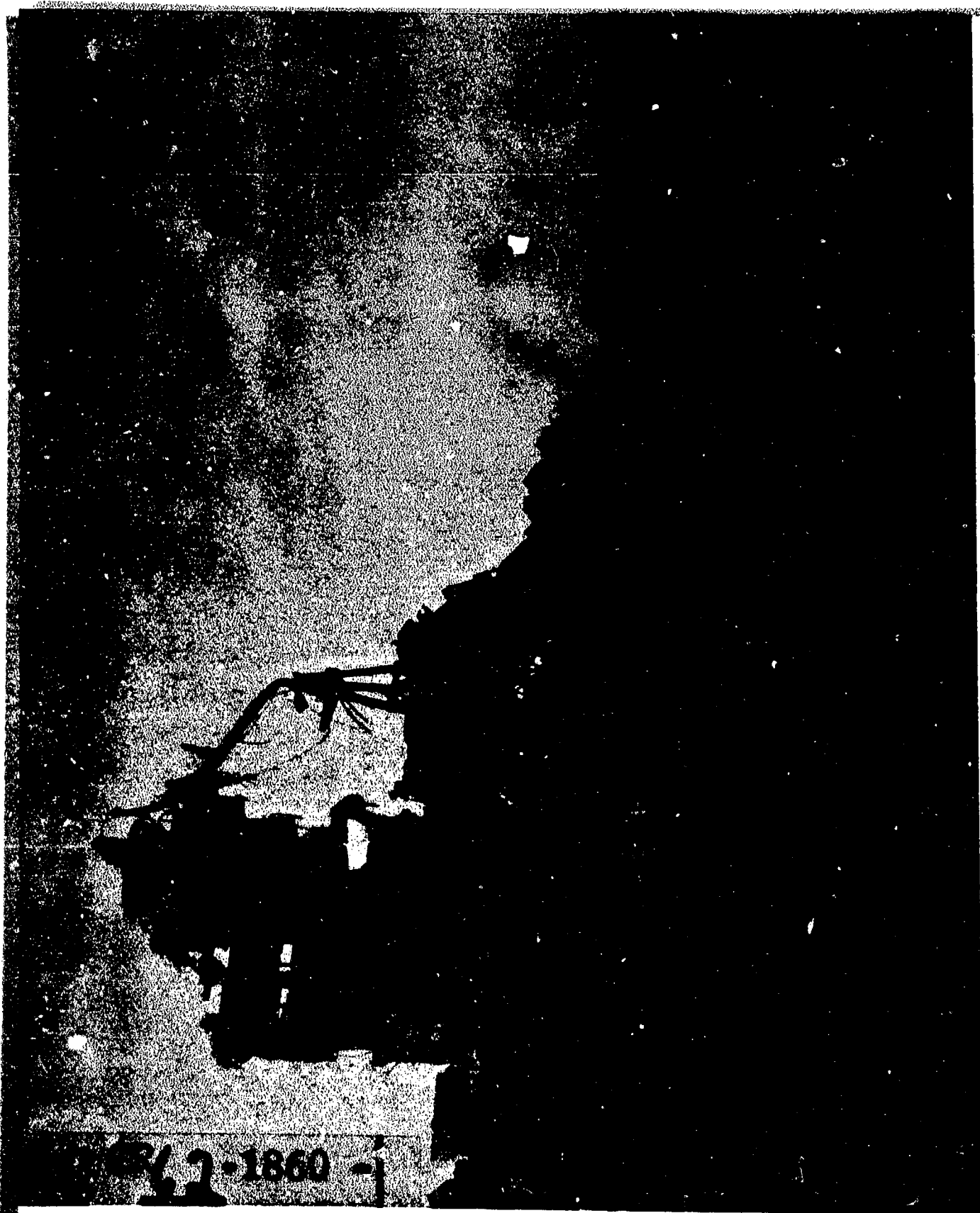
AA-CR-62-1832-4. Air blast damage on SAKAWA. House structure located amidships on main deck smashed forward and down. Stack demolished. Foretopmast bent forward. Longitudinal bulkhead of house structure forward of bridge sheared at frame 65.

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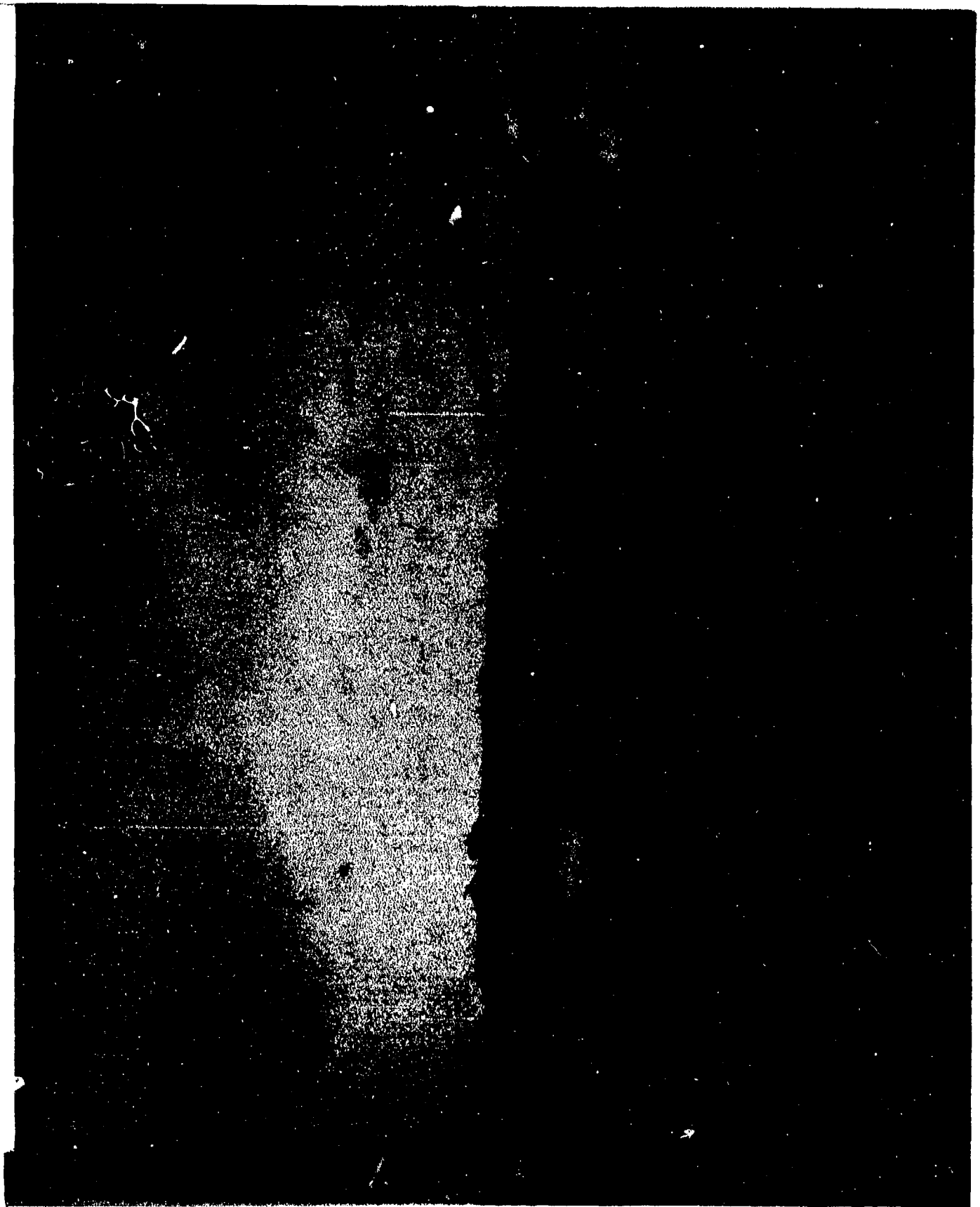
AA-CR-62-1860-2. Port view of SAKAWA superstructure damage. Amidships house is a mass of rubble and stack has been smashed and blown forward against the twisted foremast.

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AA-CR-62-1860-1. Port view of SAKAWA showing main deck air blast damage with crumpled stern awash and still burning..

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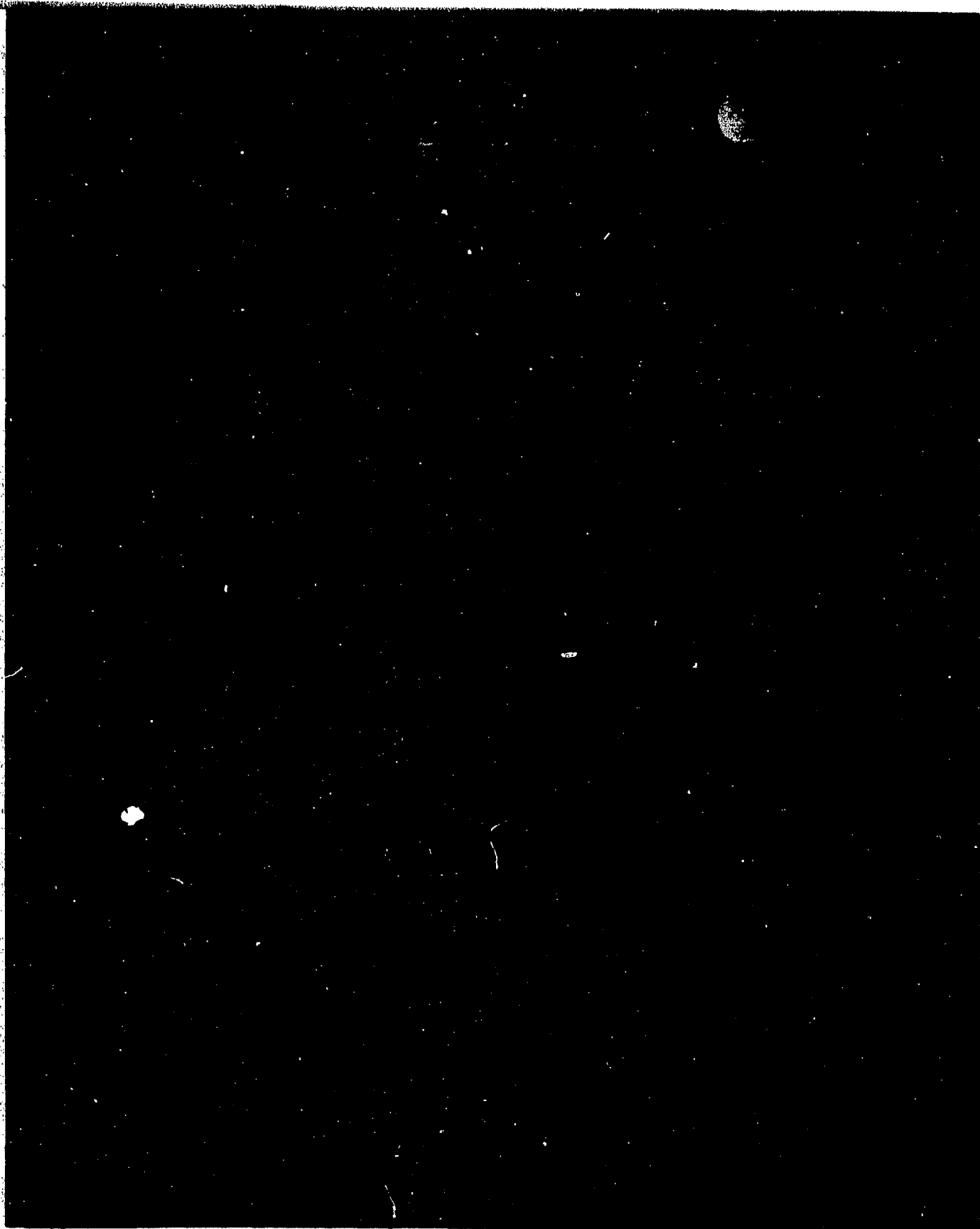


DA-CR-230-561 (-11) 1 July 46/8 1/4" Bklni. Print #61. SAKAWA
after blast.

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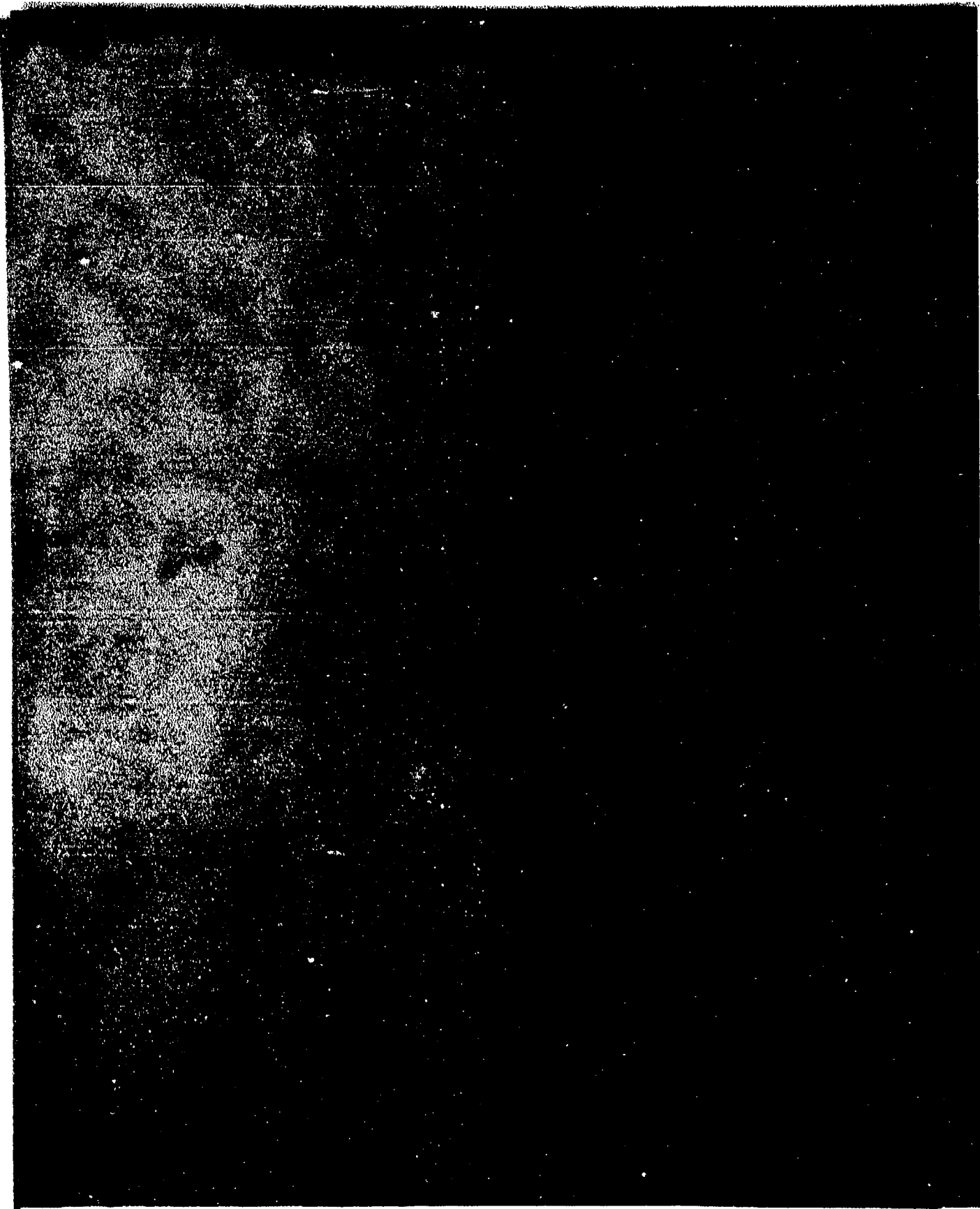
AA-CR-92-1771-6. SAKAWA on her port side and down by the stern.

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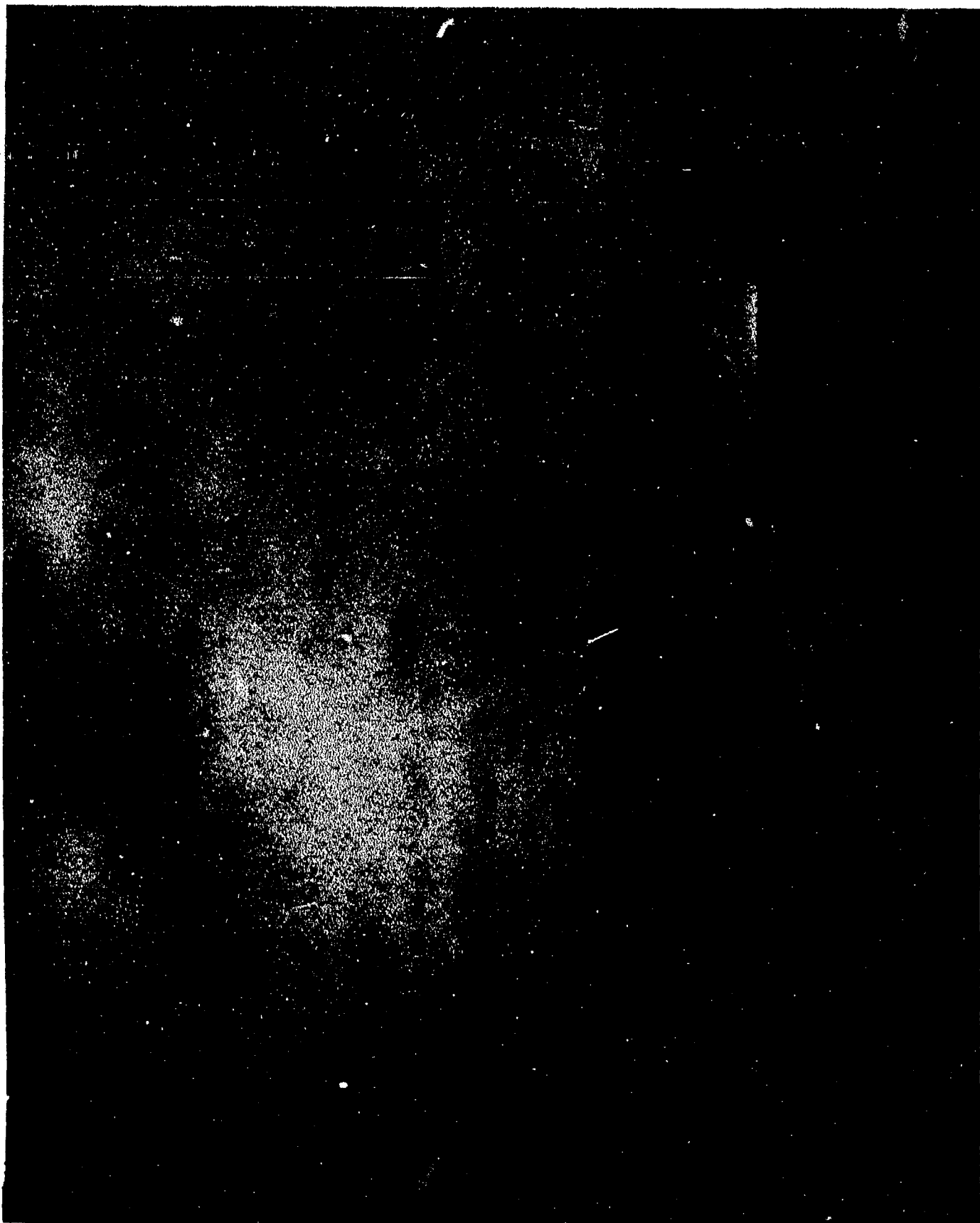
AA-CR-92-1771-8. SAKAWA bow rises as she begins to dive by the stern.

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AA-CR-92-1771-9. SAKAWA continues to sink by the stern.

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Defense Special Weapons Agency
6801 Telegraph Road
Alexandria, Virginia 22310-3398

TRC

4 April 1997

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ATTN: OMI/Mr Bill Bush

SUBJECT: Declassification of Documents

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XRD-41, AD-366731-
XRD-42, AD-366732-
XRD-40, AD-366730-
XRD-39, AD-366729-
XRD-38, AD-366728-
XRD-34, AD-366720-
XRD-13, AD-366725-
XRD-8, AD-366699-
XRD-5, AD-366697-
XRD-6, AD-366698-
XRD-21, AD-366708-
XRD-27, AD-366714-
XRD-22, AD-366709-
XRD-26, AD-366713-
XRD-28, AD-366715-
XRD-29, AD-366727-
XRD-36, AD-366722-

If you have any questions, please call me at 703-325-1034.

Arndith Jarrett
ARDITH JARRETT
Chief, Technical Resource Center